Annual Index to ELECTRICAL ENGINEERING for Volume 80, 1961

This section contains complete multientry indexes covering the contents of *Electrical Engineering* for the calendar year 1961. It includes all special articles and authors, all news items, and all items published on AIEE technical program papers, whether they appear in the form of a digest, essentially full text, or full text. The technical program papers are indexed also by both title and author.

With further reference to technical program papers, if a *Digest* appears, it will be listed as (Digest of 61-000). If the essentially full text or the full text appears, it will be listed simply as (61-000).

The contents are arranged according to **Subject** and **Author Index** listing articles and authors; **News Index** listing all items that appeared in Institute Activities (AIEE on the Move) and Of Current Interest (Progress in Technology) sections, with a **Biographical Index** of personal and obituary items on AIEE members.

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CP62-33 (III). **Measuring Transient Current in a Short-Circuit Laboratory,** *J. S. Withers.* With proper selection and use a high degree of accuracy can be obtained with current transformers used to transform transient current on a low-power-factor 60-cycle circuit. The chief factor affecting the selection of a current transformer for a transient current is core saturation. Core saturation can be prevented with a current transformer of the proper type and size used in conjunction with a scheme to reduce residual magnetism.

62-36 (III). **Bibliography on the Surge Performance of Transformers and Rotating Machines — First Supplement,** *P. A. Abetti.* This supplement to the "Bibliography on the Surge Performance of Transformers and Rotating Machines," published in 1958, includes 237 additional references from 1932 through 1961. The large number of references published since 1957 indicates that activity in this field is continuing at a high level in many countries.

62-54 (III). **An Accelerated Screening Test for Polyethylene High-Voltage Insulation,** *O. S. Pratt.* Polyethylenes are rated for relative a-c dielectric strength by their treeing tendency at a "standard defect," i.e., a needle point imbedded in a block of polyethylene and stressed vs. a remote ground. The "1-hour characteristic voltage," defined as that causing half a group of samples to develop trees in one hour, has been raised by additives from 19 kv (original) to as high as 80 kv. Results correlate with a-c step and life tests on wire.

CP62-62. **Experiments with Galloping Spans,** *J. J. Ratkowski.* The energy imparted to a galloping span by the wind and the energy dissipated by frictional sources in it are investigated, and a short-span experimental line fitted with air foils is used to verify the method of calculating the energies. The experience gained from various test spans is presented. The input energy and the energy dissipation of a full-scale span are investigated for a hypothetical conductor cross section. The role that torsional motion plays in galloping is discussed.

62-67 (III). **Research and Development Leading to the High-Power Vacuum Interrupter—An Historical Review,** *J. D. Cobine.* A history of the development of a successful, high-power vacuum interrupter is presented. This covers two principal phases: (1) early engineering effort in the late 1920's and early 1930's to produce a commercial interrupter; and (2) a review of the research and engineering at General Electric covering new technologies necessary for the development of the high-power vacuum interrupter. A short review of the literature is included.

62-68 (III). **Load Forecasting on the TVA System. I—Substation Loads,** *W. R. New.* Efficient planning and design of the transmission system depends upon reasonably accurate forecasts of the loads it will serve. Forecasts are prepared by the Tennessee Valley Authority 15 years in advance. For the first five years, preliminary forecasts are prepared by months, using time series analysis, carefully collected information, and judgment. Loads for another 10 years are extended largely on the basis of judgment. These forecasts are subjected to three critical reviews resulting in necessary modifications.

62-99 (III). **Bibliography on Extra-High-Voltage Systems — First Supplement,** *P. A. Abetti.* (Price $1.50 and $3.00) This supplement to the "Bibliography on Extra-High-Voltage Systems," published in February 1959, includes 988 additional references from 1915 through 1960. The large number of references published since 1958 indicates the world-wide activity in this field.

62-100 (III). **Optimum Operation of a Hydrothermal System,** *J. H. Drake, L. K. Kirchmayer, R. B. Mayall, H. Wood.* Variational methods are used to develop co-ordination equations for use in the digital computer solution of optimum operation of a hydrothermal system with series plants, multiple chains of plants, and intermediate reservoirs. These have been applied in integrating the hydro and steam resources of the Southern California Edison Company for up to a week. The output is hourly plant loadings which provide operation at minimum fuel cost.

62-105 (III). **The Effect of Temperature and Thermal Aging on the Electrical Characteristics of Film-Type Wire Insulations in Transformer Oil,** *M. F. Beavers, G. F. Lipsey.* This paper presents observations and data on various types of film insulations tested under various environmental conditions showing the effect of temperature and thermal aging on the dissipation factor and dielectric strength. A test procedure is suggested for film insulations intended for use in sealed oil-immersed apparatus, whereby the dielectric characteristics are obtained at the aging temperature and under the aging conditions.

62-112 (III). **Economic System Operation Considering Valve Throttling Losses. Part I—Method of Computing Valve Loop Heat Rates on Multivalve Turbines,** *H. H. Happ, W. B. Ille, R. H. Reisinger.* The heat rate characteristics of reheat and nonreheat machines including a rigorous treatment of throttling have to be obtained prior to an investigation of the savings made possible by reducing the throttling losses. The purpose of this paper is to describe an analytical method and an associated computer program for calculating the heat rate valve loops for multivalve nonreheat and reheat machines.

62-117 (III). **Equivalent Circuits for Cylindrical-Rotor, Reluctance, and Salient-Rotor Synchronous Machines,** *Gordon R. Slemon.* This paper presents a unified approach to the steady-state analysis of polyphase synchronous machines of three major types—cylindrical rotor, reluctance, and salient rotor. The major magnetic parameters of the machines are derived. Single-phase equivalent circuits are developed for each of the machine types. These equivalent circuits may be incorporated directly into the single-phase network representing a power system.

62-129 (III). **Economic System Operation Considering Valve Throttling Losses. Part II—Distribution of System Loads by the Method of Dynamic Programming,** *R. J. Ringlee, D. D. Williams.* Minimum fuel cost dispatches have been determined for a group of steam turbine generators by an algorithm employing dynamic programming. This permits accurate recognition of the "loop effect" in the input-output function caused by the throttling losses. A digital computer program compared the fuel costs resulting from several common dispatching criteria. Nearly the optimum dispatch was obtained with the stepped incremental method.

Science and Electronics

62-19 (I). **Low-Loss Materials for Printed Microwave Applications,** *T. D. Schlabach, R. J. Colardeau.* Close examination of traditional copper-clad low-loss materials revealed serious electrical shortcomings which precluded their use in certain critical printed microwave applications. To overcome these shortcomings, a new class of copper-clad low-loss polyolefins was developed. The polyolefin systems were characterized and found to be satisfactory for these applications, while offering cost, weight, and design advantages.

CP62-41. **Three-Phase Transformer-Rectifier Power Converters,** *D. S. Toffolo.* New concepts for regulated 3-phase transformer rectifier power converters are given. These are synthetic secondary windings on the transformers, d-c compensating windings, closed tertiaries, linear bias and control windings all on saturable reactors in series with the transformer primaries. Their assembly reduces the current harmonics in the primary phase current, eliminates the voltage spikes on the load bus, and matches the saturable reactor impedance to load current and variable input voltage.

CP62-64. **Pattern Recognition by Random Lines,** *David Rubenstein.* A pattern-recognizing machine that "throws" random lines on the pattern is outlined. The intercepts of the random lines with the pattern are measured and classified as to number and length. With a large number of random lines on the pattern, the observed frequencies will approximate the expected frequencies; therefore, one can identify a pattern with very high probability. The machine will recognize patterns irrespective of position orientation and size; it can be made self-organizing; it will recognize a pattern after one presentation; probabilities of confusion can be computed without the machine; and it can be implemented with present technology.

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